7-5. (AMENDED) A virtual keyboard as defined in claim 4 6, wherein:

one of the received position information, when both of the special key and the general key are pushed at the same time, is a furthest returning position from the special key in the information of positions detected in a time sequence, and

the position of the general key is determined by doubling a distance between [special key] a start position and the furthest position.

Bg cancel- 8 6. (AMENDED) A virtual keyboard as defined in claim 4 6, wherein a distance between a [start] position of the first pushed key and a furthest returning position, when both of the special key and the general key are pushed at the same time, that are of the information of positions detected in a time sequence is doubled to identify the position of the general key.

REMARKS

Applicant appreciates the Examiner's thorough examination of the subject application and requests reconsideration of the subject application based on the foregoing amendments and the following remarks.

Applicant also acknowledges with much thanks the in-person interview with the Examiner and his SPE and the undersigned regarding the 35 USC §112 rejections and the prior art.

Claims 1 through 6 are pending in the subject application. Claims 1 through 6 stand rejected under 35 U.S.C. §103, and/or 35 U.S.C. §112, first paragraph.

Claims 1 through 6 were amended to only address the Examiner's non-art based rejections. These claims also were amended to more distinctly claim the sequential nature of the pushing of the special and general keys to deal with the Examiner's concern regarding the "at the same time" language of these claims. The amendments to the claims are supported by the originally filed disclosure.

35 U.S.C. §112, FIRST PARAGRAPH REJECTIONS

Claims 2-3 and 5-6 stand rejected under 35 U.S.C. §112, first paragraph as provided on page 2 of the above-referenced Office Action because the subject application does not disclose or teach how to determine the position of a middle position or a furthest position without the position of the general key. Because these claims were amended in the foregoing amendment for clarity, the following discussion refers to the language of the amended claims.

Enclosed herewith are the materials provided to the Examiner during the recent in-person interview as explanation of the process by which the position of the general key is determine in accordance with the present invention. In this regard it should be noted that one of the numbers of the tabulation was revised by hand to correct a typo noticed during the in-person interview (i.e., 28.8 to 28.3). Also provided with the enclosed are selected figures from the subject application, that show the electrical configuration of the transparent resistance wires when a single key is being pushed and also when two keys are being pushed (FIG.3).

During this discussion, the Examiner indicated that the enclosed explained how the furthest position is determined as recited in claim 2. The Examiner, however,

requested and Applicants also agreed to further amend at least the independent claims to more particularly describe the process of the pushing of the special and general keys. As had been suggested by the Examiner, the language on page 9 of the subject application was used to describe the sequencing of the pushing of the special and general keys. This represents the replacing of the "at the same time" language referred to in the interview summary.

Accordingly, claims 2-3 and 5-6 satisfy the requirements of 35 U.S.C. 112, first paragraph and, therefore, these claims are allowable and the specification is considered acceptable.

35 U.S.C. §103 REJECTIONS

Claims 1 and 4 stand rejected under 35 U.S.C. § 103 as being unpatentable over the cited prior art for the reasons provided on pages 3-5 of the above-referenced Office Action. Because claims were amended in the foregoing amendment, the following discussion may refer to the language of the amended claim(s). However, only those amended features specifically relied on in the following discussion shall be considered as being made to overcome the prior art reference. The following addresses the specific rejections provided in the above-referenced Office Action.

CLAIMS 1 & 4/ Ouellete et al.

Claims 1 and 4 stand rejected as being unpatentable over Ouellette et al. [USP 5,581,243; "Ouellette"] for the reasons provided on pages 3-4 of the above referenced Office Action. As support for the rejection, the above-referenced Office Action refers to

column 1, lines 47-63 and column 5, lines 4-10 of Ouellette. Applicant respectfully traverses.

Ouellette provides in column 1, lines 54-57 that the "touches" on the display cause the generation of coded electrical signals corresponding to the locations that are touched, and thereby representing..., which indicates signals corresponding to the places which are touched. However, Ouellette is completely silent on that a middle position signal is outputted when two keys are pressed at the same time as is taught in the present invention.

While the feature of the present invention is to detect a trace including the middle point to specify a general key position according to the coordinate values of the trace. It is fairly clear that Quellette does not disclose such function. Further, Ouellette states that "capital or lower case letters depending on whether the displayed key is touched", column 1, lines 58-59. This wording of Ouellette just indicates the toggling function where one switches between a capital letter input mode and a lower case letter input mode, such toggling function being provided for an actual keyboard.

The statement in column 1, lines 52-54 that the user touches the touch-sensitive-screen on the displayed keys in the same fashion as that a typist uses a conventional keyboard is an over simplified statement of the process and in no way suggests how or that one can determine the position of a one key using the determined middle position when two keys are being pushed at the same time. In sum, the wording in Ouellette does not describe the present invention nor does this reference provide any teaching or suggestion that a middle position between two keys can be determined when the two keys are being pushed and that this middle position can be used to

develop a position of one of the two keys being pushed.

It is respectfully submitted that claims 1 and 4 are patentable over the cited reference(s) for the foregoing reasons.

CLAIMS 1 & / Quellette et al. & Dunthorn

Claims 1-4 stand rejected as being unpatentable over Quellette et al. (USP 5,581,243; "Ouellette") in view of Dunthorn (USP 4,914,624] for the reasons provided on pages 4-5 of the above referenced Office Action. Applicant respectfully traverses.

As indicated in the above discussion, Ouellette does not disclose, suggest or teach Applicant's invention as set forth in either of claims 1 and 4.

As to Dunthorn, this reference discloses a touch-sensitive screen wherein when two places are touched at the same time, a function for canceling a process etc. is outputted. Applicant respectfully submits that Dunthorn does *not* describe, teach or suggest a process whereby such pushing of two keys is originally directed to input character data represented by the pushed keys. Further, as indicated in Fig. 2 and column 4 thereof, Dunthorn does not utilize a furthest detected position but rather uses a sudden and large change in detected position to effect the outputting. Such a sudden change occurs when two positions are touched, differing from the present invention in the realization of positions.

It is respectfully submitted that claims 1 and 4 are patentable over the cited reference(s) for the foregoing reasons.

Applicant believes that the foregoing reflects the discussion with the Examiner, in which the Examiner indicated that the arguments concerning the prior art appeared

to overcome the prior art rejections, but that further search and consideration would be required because of the nature of the amendments.

It is respectfully submitted that for the foregoing reasons, claims 1 and 4 are patentable over the cited reference(s) and satisfy the requirements of 35 U.S.C. §103. As such, these claims, including the claims dependent therefrom are allowable.

It is respectfully submitted that the subject application is in a condition for allowance. Early and favorable action is requested.

Applicant believes that additional fees are not required for consideration of the within Response. However, if for any reason a fee is required, a fee paid is inadequate or credit is owed for any excess fee paid, you are hereby authorized and requested to charge Deposit Account No. **04-1105**.

Respectfully submitted,

DIKE, BRONSTEIN, ROBERTS
& CUSHMAN

Date: October 23, 2000

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Explanation of how one can determine the furthest returning position without knowing the position of the general key.

Suppose that three of the keys comprising the keyboard are defined as follows;

Suppose that the area or locus of "Shift" key is in a rectangle with the 4 apexes at the following coordinates: (X,Y)=(5,5),(15,5),(15,15),(5,15).

Suppose that the area or locus of "x" key (a lower case key) is in a rectangle with the 4 apexes at the following coordinates: (X,Y)=(25,5),(35,5),(35,15),(25,15).

Suppose that the area or locus of "r" key (a lower case key) is in a rectangle with the 4 apexes at the following coordinates: (X,Y)=(45,45),(55,45),(55,55),(45,55).

SINGLE KEY PRESSED

Now suppose that only the "x" key is depressed or pushed. From the attached Tabulation of Detected Positions and Distance from Starting Position for trace A, it can be seen that all positions are located in the area of the "x" key. Thus, the processor generates the character "x" the lower case alphabetic character.

For purposes of illustration Figure aa attached hereto shows the loci of the "x" key and the detected coordinate positions for each of the time sequenced detected points on the within Tabulation.

TWO KEYS PRESSED

Now for the case when both the "Shift" and "r" keys are to be depressed. From the attached Tabulation of Detected Positions and Distance from Starting Position for trace B, it can be seen that the starting position and the end position are located in the area of Shift key.

As also shown in the tabulation, a distance from the starting point is calculated for every detected point for each time interval. The processor compares each calculated distance and then determines the detected position (i.e., X,Y coordinates) that corresponds to the furthest position from the starting position. In the case of the illustrative example, the furthest calculated distance is 28.8 units corresponding to time = 1.7 sec. and also corresponding to X,Y coordinates of 30,30. These coordinates also correspond to the furthest returning position.

The processor then calculates the X,Y coordinates of the target position by means of the following relationships

$$X_T = X_{sp} + 2\ (X_{fp} - X_{sp})$$

$$Y_T = Y_{sp} + 2\ (Y_{fp} - Y_{sp})$$

where:

X_T: is the x coordinate of the target position

X_{sp}: is the x coordinate of the starting position

X_{fp}: is the x coordinate of the furthest returning position

Y_T: is the y coordinate of the target position

Y_{sp}: is the y coordinate of the starting position

Y_{fp}: is the y coordinate of the furthest returning position

Inputting the x and y coordinates from the attached tabulation corresponding to the starting position and the furthest returning position into the above, results in the following (also would be calculated by the processor):

$X_T=10+2*(30-10)=2*30-10=50$

$Y_T=10+2*(30-10)=2*30-10=50.$

Thus, the processor would find that the target position is (X,Y)=(50,50). This is within the area bounded by the "r" key. With this simple scheme, a person can determine the furthest returning position (30,30) without the position of the general key. Furthermore one can determine that the secondly pushed position is (50,50).

Because it is determined that both the shift key and the "r" key were depressed at the same time, the processor generates the character "R"(upper case letter).

For purposes of illustration Figure bb attached hereto shows the loci of the "Shift" key, the "r" key and the detected coordinate positions for each of the time sequenced detected points provided on the Tabulation

Tabulation of Detected Positions and Distance from Starting Position

Time (sec.)	X Coordinate	Y Coordinate	Distance from starting position	Explain	Name
0.1	Not detected	Not detected	-		
0.2	Not detected	Not detected	-		
0.3	Not detected	Not detected	-		
0.4	30	10	0	Starting position	Trace A
0.5	32	10	2		Trace A
0.6	31	11	1.4		Trace A
0.7	30	9	1		Trace A
0.8	Not detected	Not detected	-		
0.9	Not detected	Not detected	-		
1.0	Not detected	Not detected	-		
1.1	Not detected	Not detected	-		
1.2	Not detected	Not detected	-		
1.3	10	10	0	Starting position	Trace B
1.4	10	11	1		Trace B
1.5	9	10	1		Trace B
1.6	30	29	27.6		Trace B
1.7	30	30	~~28.8~~ 28.3	Furthest Returning Position	Trace B
1.8	29	30	27.6		Trace B
1.9	11	9	1.4		Trace B
2.0	10	11	1		Trace B
2.1	Not detected	Not detected	-		
2.2	Not detected	Not detected	-		

$$Dsp = \sqrt{\Delta X^2 + \Delta Y^2}$$

where ΔX and ΔY are determined as follows

$$\Delta X = Xip - Xsp$$

$$\Delta Y = Yip - Ysp$$

and where -

Dsp is the distance from the starting position

Xip is an X coordinate for one of the times a measurement is to be made (e.g., 1.7 seconds)

Xsp is the X coordinate of the starting position

Yip is the Y coordinate for the same time as when Xip is determined

Ysp is the Y coordinate of the starting position

For example, the distance from the starting point at the time of T = 1.7 seconds is determined as follows:

$$Dsp = \sqrt{(30-10)^2 + (30-10)^2}$$

$$Dsp = \sqrt{20^2 + 20^2}$$

$$Dsp = 28.3$$

PROPOSED CLAIMS

1. (TWICE AMENDED) A virtual keyboard comprising:

a display for displaying a keyboard;

a transparent pressure-sensitive panel disposed on the display; and

a processor for receiving information of positions detected and sent in a time sequence from the pressure sensitive panel when one of a special key and a general key in the keyboard is first pushed and thereafter when [a combination of a general key and a special key in the keyboard is] both of the special key and the general key are pushed at the same time, identifying a position of the pushed general key according to the received position information and outputting a code corresponding to the [pushed] combination of the pushed special key and the general key corresponding to the identified position.

2. (TWICE AMENDED) A virtual keyboard as defined in claim 1, wherein one of the received position information, when both of the special key and the general key are pushed at the same time, is a furthest returning position from the special key [in the information of positions detected in a time sequence] and wherein the position of the general key is determined by doubling a distance between the special key and the furthest returning position.

3. (AMENDED) A virtual keyboard as defined in claim 1, wherein a distance between a [start] position of the first pushed key and a furthest returning position, when both of the special key and the general key are pushed at the same time, that are of the information of positions detected in a time sequence is doubled to identify the position of the general key.

4. (AMENDED) A virtual keyboard comprising:

a display that displays a keyboard;

a transparent pressure-sensitive panel disposed on the display; and

a processor that receives information of positions detected and sent in a time sequence from the pressure sensitive panel when one of a special key and a general key in the keyboard is first pushed and thereafter when [a combination of a general key and a special key in the keyboard is] both of the special key and the general key are pushed at the same time, that identifies the pushed general key by determining a position of the pushed general key according to the received position information of

the first pushed key and the pushed combination of the special key and the general key and [which] that outputs a code corresponding to the [pushed] combination of the pushed special key and the identified general key.

5. A virtual keyboard as defined in claim 4, wherein:

one of the received position information, when both of the special key and the general key are pushed at the same time, is a furthest returning position from the special key in the information of positions detected in a time sequence, and

the position of the general key is determined by doubling a distance between the special key and the furthest position.

6. A virtual keyboard as defined in claim 4, wherein a distance between a [start] position of the first pushed key and a furthest returning position, when both of the special key and the general key are pushed at the same time, that are of the information of positions detected in a time sequence is doubled to identify the position of the general key.